



TITLE:

Inter-university Upper atmosphere Global Observation NETwork (IUGONET): Development of metadata database.

AUTHOR(S):

HAYASHI, Hiroo; HORI, Tomoaki; KOYAMA, Yukinobu;
TANAKA, Yoshimasa; YOSHIDA, Daiki; UENO, Satoru;
KAGITANI, Masato; ... OKADA, Masaki; NOSE, Masahito;
NAKAMURA, Takuji

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IUGONET

Metadata DB for Upper Atmosphere

超高層大気長期変動の全球地上ネットワーク観測・研究
Inter-university Upper atmosphere Global Observation NETwork

Inter-university Upper atmosphere Global Observation NETwork (IUGONET) - Development of metadata database -

H. Hayashi¹, T. Hori⁵, Y. Koyama², Y. Tanaka⁶, D. Yoshida²,
S. UeNo³, M. Kagitani⁷, T. Kouno⁵, S. Abe⁴, N. Kaneda³,
Y. Miyoshi⁵, M. Okada⁶, M. Nosé², and T. Nakamura⁶

1. RISH, Kyoto Univ., 2. WDC/Kyoto, Kyoto Univ.,
3. Kwasan and Hida Observatories, Kyoto Univ.
4. SERC, Kyusyu Univ.,
5. STE Lab., Nagoya Univ., 6. NIPR,
7. PPARC, Tohoku Univ.



The IUGONET project - Objectives

Purposes of this 6-year (2009-2014) project are:

- to develop a metadata database (DB) of the upper atmosphere (UA) data accumulated over 50 years since IGY by Japanese institutes/universities.
- to promote effective use of the observational data and comprehensive studies of the UA.
- to investigate mechanism of long-term variation in the UA

This project is supported by Special Educational Research Budget (Research Promotion), MEXT, Japan

Participating universities and research institutes

- Planetary Plasma and Atmospheric Research Center, Tohoku University
- National Institute of Polar Research
- Solar Terrestrial Environment Laboratory, Nagoya University
- Research Institute for Sustainable Humanosphere, Kyoto University
- World Data Center for Geomagnetism, Kyoto University
- Kwasan and Hida Observatories, Kyoto University
- Space Environment Research Center, Kyushu University



Project members

- Tohoku Univ.
T. Ono, N. Terada
[M. Kagitani](#)
 - National Institute of Polar Research
N. Sato, T. Nakamura,
H. Miyaoka, M. Okada,
Y. Tomikawa
[Y. Tanaka](#)
 - Solar Terrestrial Environment Lab.,
Nagoya Univ.
T. Ogino, Y. Miyoshi, Y. Otsuka
[T. Hori, T. Kouno](#)
 - World Data Center, Kyoto Univ.
T. Iyemori, M. Nosé
[Y. Koyama, D. Yoshida](#)
 - Research Institute of Sustainable
Humanosphere, Kyoto Univ.
T. Tsuda
[H. Hayashi \(*\)](#)
 - Kwasan and Hida Observatory, Kyoto
Univ.
K. Shibata
[S. UeNo, N. Kaneda](#)
 - SERC, Kyushu Univ.
K. Yumoto
[S. Abe](#)
- [Member of core development team](#)
[\(*\) Lead of development team](#)



Observations by IUGONET institutions

Iceland
aurora imager x2
magnetometer x3

Svalbard: IS radar (EISCAT),
meteor radar, aurora imager



Toromso
IS radar (EISCAT)
meteor radar
MF radar

**MU radar
@Shigaraki**

**SuperDARN
Hokkaido HF radar**

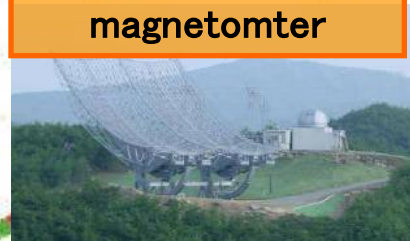
**Solar
observatory
(Kyoto Univ.)**



**Equatorial Atmospheric Radar
(EAR)**



**Iitate, Onagawa
radio telescope
magnetomter**



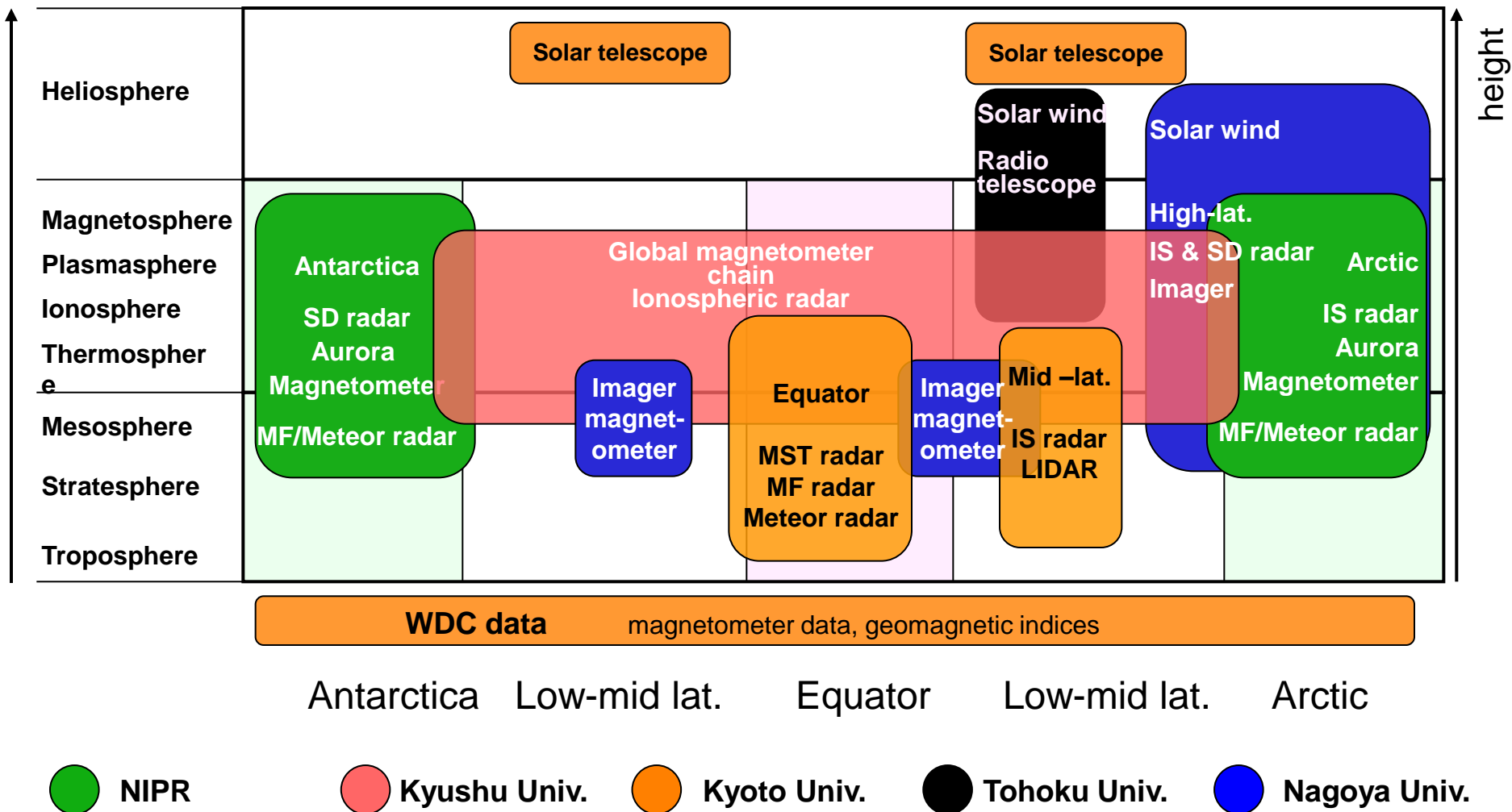
SYOWA base
SuperDARN radar x2
MF radar
aurora imagers
magnetometer chain
ELF obs. (conjugate with
Onagawa)



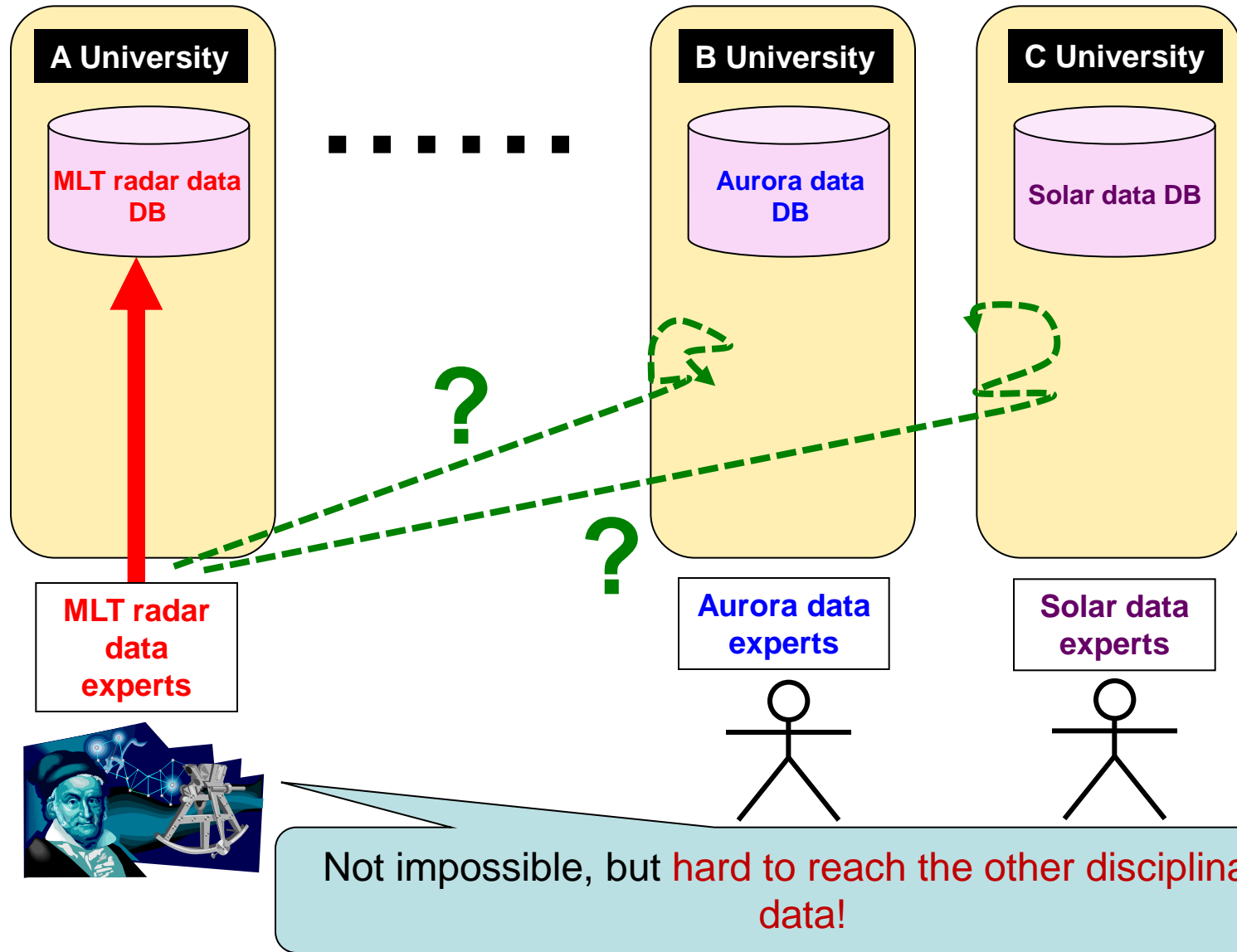
- MST radar
- ▲ MF / meteor radar
- ◆ MAGDAS magnetometer
- ★ FM-CW radar
- OMTI imager
- WDC magnetometer



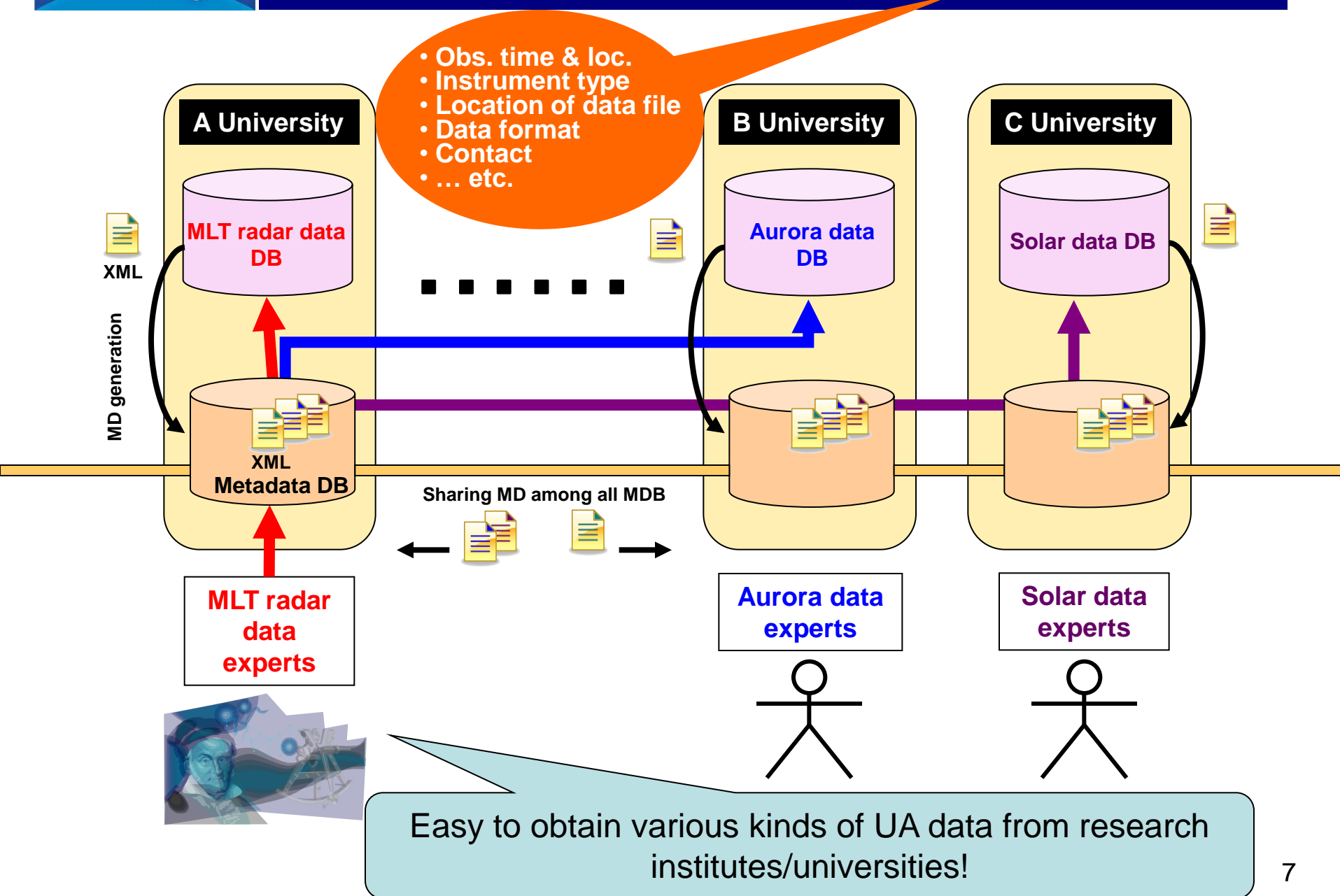
Spatial coverage of observations

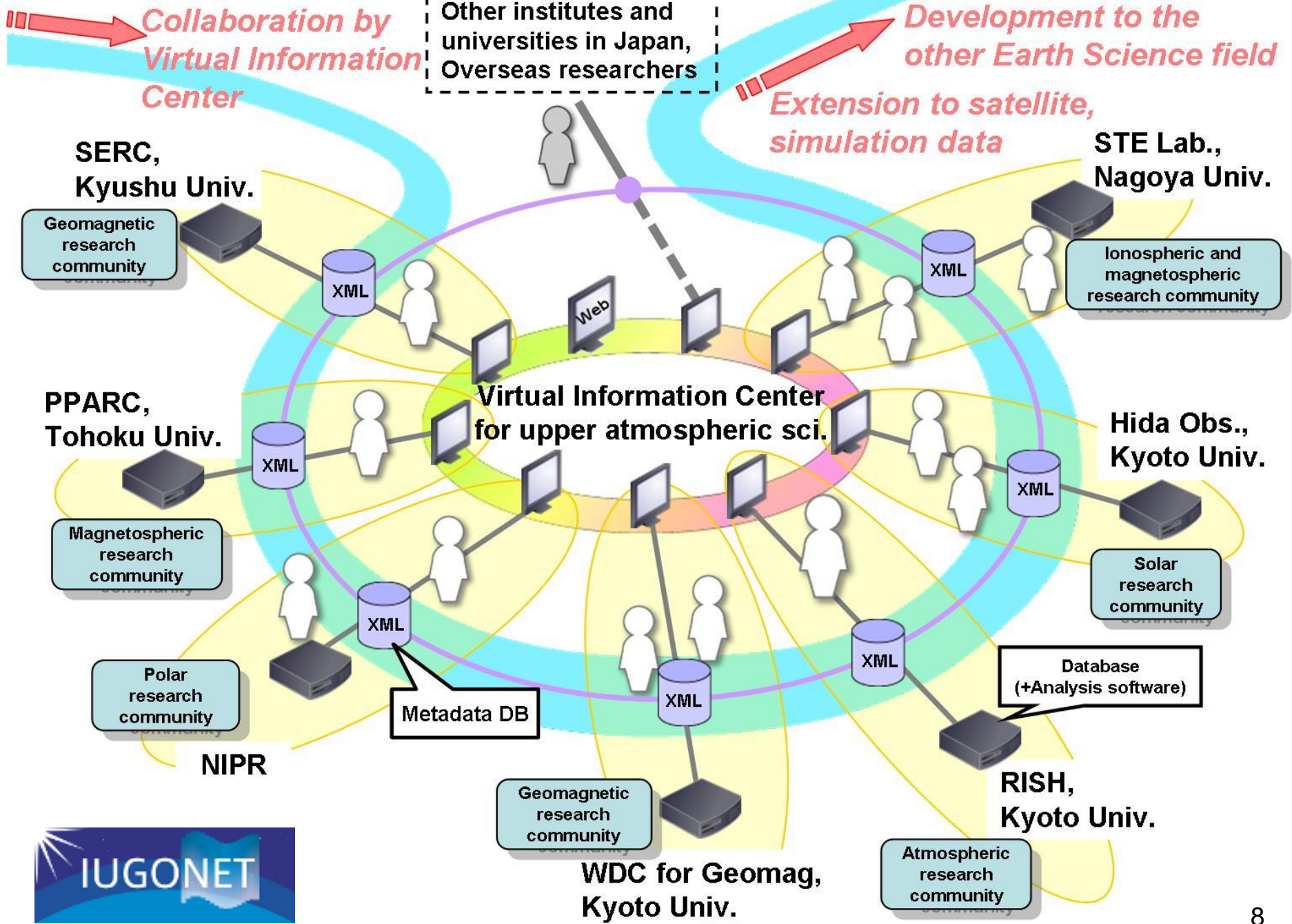


Problem with databases



Database access through metadata DB







Project Timeline

Task	Y2009	Y2010	Y2011	Y2012	Y2013	Y2014	Detail
Virtual information center (VIC) of UA studies	System installation 			System update			Construct the integrated research environment (TV-conference system, ..)
Development of metadata DB system	Prototype system devel. 		Open to public				Design and develop the metadata DB system
Design the Metadata format standards	Ver.1 format 						Release the format ver.1 and keep updating if necessary
Development of data analysis software tools	Specifications and basic design 		Open to public				Develop and release analysis softwares for UA data
Maintenance&extension of existing DBs of Observation data							Incorporate non-DB'd data into the DBs
Metadata generation							Generate metadata in the designated format and add to metadata DB
Operation of metadata DB							Release the metadata DB for community
VIC extension to related fields							Wrap up the project and discuss further extension



Design of Metadata format

Ver. 1 metadata format : SPASE with some modifications

Space Physics Archive Search and Extract (SPASE) Consortium

Home

Steering Committee

Data Model Working Group

Technical Working Group

Tools and Services

Consortium Members

Announcements:
SPASE face-to-face meeting (July 9-11, 2007) [more...](#)

Have a question?
[Ask SPASE](#)

The SPASE data system is a model for scientific data systems. It is based on the latest web-based technologies and is designed to be a distributed data systems with a heterogeneous mix of platforms and systems.

These pages focus on the data model for the SPASE data system. The data model includes the structure of messages passed between systems; how to enrich data for interchange and archiving; and a data dictionary defining all terms and keywords used in the system. A full description of the data model is included under [Documents](#).

Also included are [examples](#) that implement the data model.

[Tools](#) to demonstrate the utility and capability of the SPASE metadata and framework

If you should have any questions or comments please [contact](#) us.

The [members](#) of SPASE include representatives from the international community.

Data Model Document

[History of changes](#)

[Current Version \(2.0.0\)](#)

Released: 2009-04-29

[Current Draft \(2.0.1\)](#)

updated: 2009-07-10

[All documents](#)

Services

[SMWG Registry Search](#)

[Naming Authority](#)

[Groups and Mailing Lists](#)

Data Dictionary

[Search](#)

[Tree](#)

[Explorer \(New!\)](#)

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[XML Stylesheet](#)

[XML Templates](#)

[XMI Models](#)

[Ontologies](#)

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[Briefs](#)

[RSS](#) [XML](#)

Tools

[SPASE Toolkit](#)

[On-line Validator](#)

[On-line Editor](#)

[and more...](#)

Documents

[Charters](#)

[Meetings](#)

[Presentations](#)

[Standards](#)

SPASE

<http://www.spase-group.org/>

Data model and associated metadata format developed by international consortium to comprehensively describe research resources regarding heliospheric and magnetospheric physics

Features:

- Suitable for STP data (ongoing development/improvement)
- Applicable to upper atmosphere (UA) data
- Widely-used, such as VxO
- Format, related software are open for community
- Elements/terms easily appendable (XML)
- Metadata description with XML files

Metadata examples

- **Resource ID** assigned for all resources. Each MD is described as XML
- Registered in DB by category

NumericalData:

ResourceID: spase://IUGONET/NumericalData/superdarn/hok
ResourceHeader:
ReleaseDate: 2006-11-06
ExpirationDate: 2199-12-31
Description: The Hokkaido HF radar, a member of Super Dual Auroral Network Radar (SuperDARN)
Contact:
PersonID: spase://IUGONET/Person/Nozomu.Nishitani
Role: PrincipalInvestigator
InformationURL:
URL: <http://center.stelab.nagoya-u.ac.jp/hokkaido/>
AccessInformation:
AccessRights: Restricted
RepositoryID: spase://IUGONET/Repository/STEL/superdarn/hok
AccessURL:
URL: <http://center.stelab.nagoya-u.ac.jp/hokkaido/>
Format: Binary
Encoding: BZIP2
InstrumentID: spase://IUGONET/Instrument/superdarn/hok
MeasurementType: Dopplergram
SpectralRange: RadioFrequencies
ObservedRegion: Earth.NearSurface.Ionosphere.FRegion
ObservedRegion: Earth.NearSurface.Ionosphere.ERegion

For dataset (NumericalData)

Instrument:

ResourceID: spase://IUGONET/Instrument/superdarn/hok
ResourceHeader:
ResourceName: SuperDARN Hokkaido HF radar
ReleaseDate: 2006-11-06
Description: The Hokkaido HF radar, a member of Super Dual Auroral Network Radar (SuperDARN)
Contact:
PersonID: spase://IUGONET/Person/Nozomu.Nishitani
Role: PrincipalInvestigator
InformationURL:
URL: <http://center.stelab.nagoya-u.ac.jp/hokkaido/>
InstrumentType: Dopplergram
ObservatoryID: spase://IUGONET/Observatory/superdarn/hok

For observation instrument (Instrument)

Observatory:

ResourceID: spase://IUGONET/Observatory/superdarn/hok
ResourceHeader:
ResourceName: SuperDARN Hokkaido HF radar
ReleaseDate: 2006-11-06
Description: The Hokkaido HF radar, a member of Super Dual Auroral Network Radar (SuperDARN)
Contact:
PersonID: spase://IUGONET/Person/Nozomu.Nishitani
Role: PrincipalInvestigator
InformationURL:
URL: <http://center.stelab.nagoya-u.ac.jp/hokkaido/>
Location:
ObservatoryRegion: Earth.Surface
CoordinateSystemName: GEO
Latitude: 43.53
Longitude: 143.61
Elevation: 480.0

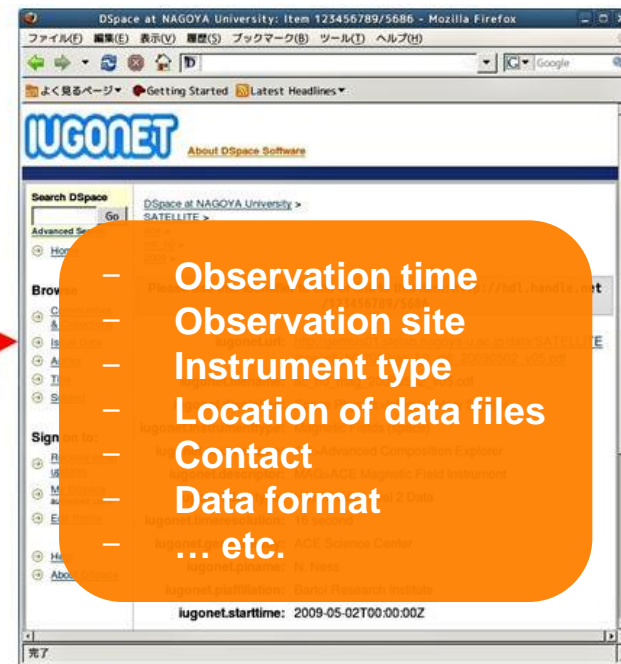
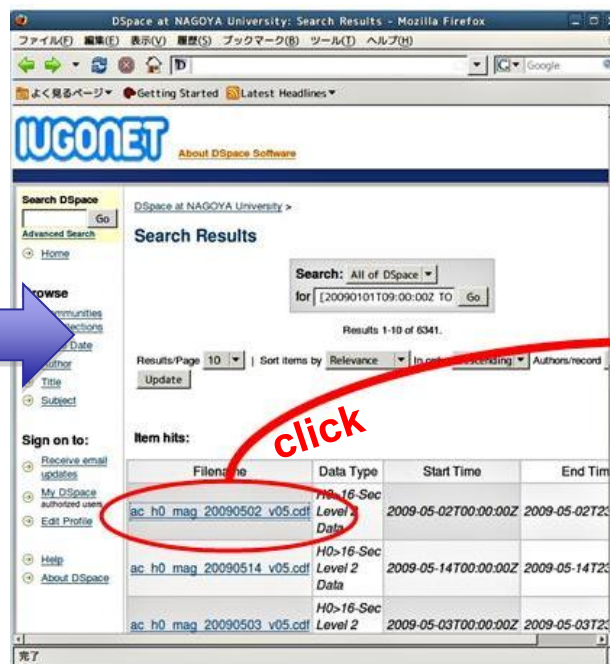
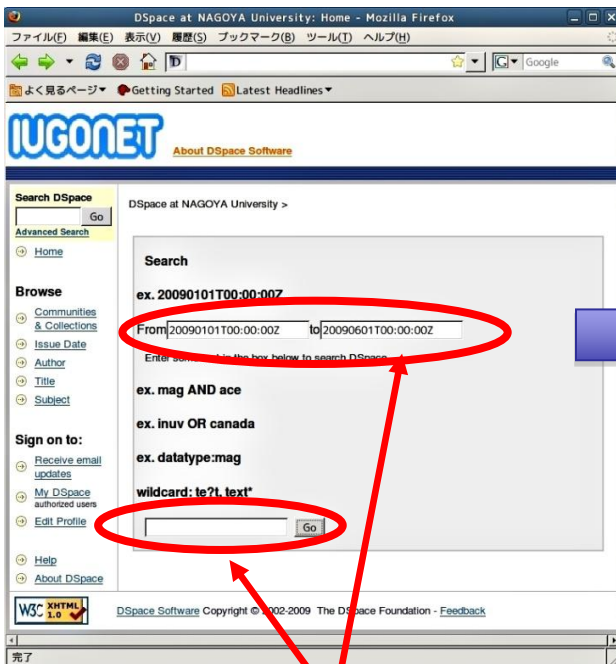
For observation site (Observatory)

Relation between resources is described by "ResourceID"



Development of Metadata DB

We are now developing the prototype of system for **registering, searching, providing, and collecting** metadata of our research field using a repository software (DSpace).



Search system by time range and/or free keywords (ex. meteor radar)

List of data sets/files satisfying the input conditions

Detailed metadata
→ Lead to data files!



IUGONET web site

URL : <http://www.iugonet.org/en>

The screenshot shows the IUGONET website homepage. At the top, there is a header with the IUGONET logo and the text "Metadata DB for Upper Atmosphere". Below this, the main content area is titled "IUGONET" and contains a paragraph describing the project: "The Inter-university Upper atmosphere Global Observation Network, IUGONET, is a six-year research project of the National Institute of Polar Research (NIPR), Tohoku University, Nagoya University, Kyoto University, and Kyushu University to build a metadata database (MDB) of ground-based observations of the upper atmosphere. We have various kinds of observational data acquired so far by a global network of radars, magnetometers, optical sensors, helioscopes, etc., but these data are archived in individual databases at each site. By developing the MDB, which will give the location and other information about the observational data, we intend to provide researchers with a seamless data environment linking databases spread across the member institutions. This MDB will be of great help in conducting comprehensive analyses with various observational data to clarify the mechanisms of the long-term variations in the upper atmosphere."

On the right side of the main content area, there is a vertical list of navigation links: [Top](#), [Objectives](#), [Member List](#), [Observation Network](#), [Metadata Database](#), [Project Timeline](#), and [News](#). Below these links is a small button labeled "日本語版 Japanese Version".

At the bottom of the main content area, there are six thumbnail images with captions: "Objectives", "Member List", "Observation Network", "Metadata Database", "Project Timeline", and "News".

At the very bottom of the page, there is a footer with the text "Contact on this page: webmaster@iugonet.org" on the left, "Copyright © 2010 IUGONET" in the center, and "last update: 2010-01-21" on the right.

- The “IUGONET” project has just started up.
- We develop a metadata DB to facilitate the efficient use of the upper atmospheric data, and thereby promote comprehensive, multi-disciplinary studies.
- Currently the metadata DB system is being developed on the basis of DSpace in which metadata are stored in the SPASE-based format.
- The metadata DB will also be of great help for the Asian-Oceanian radar community to facilitate new researches by utilizing each other’s data.